The Institute of OPTICS

# Colloquium

UNIVERSITY OF ROCHESTER

# Terahertz Wave Air Photonics


**Professor Jianming Dai**
The Center for Terahertz Research
Rensselaer Polytechnic Institute
PhD in Optics, Tianjin University, 1994


**3:00 pm, December 12, 2011**
**Sloan Auditorium, Goergen 101**
**Refreshments served**


**This talk will introduce terahertz wave air photonics —terahertz wave generation, detection, and manipulation in laser-induced gas plasma.**


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# Terahertz Wave Air Photonics


## Professor Jianming Dai

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**Abstract:** Terahertz (THz) wave generation and detection using ambient air or selected gases (i.e., laser-induced gas plasma) as the THz wave emitter and sensor, which is termed as “THz wave air photonics”, has attracted much scientific attention. Such an all-air-based THz spectroscopic system provides very high THz wave intensity and ultra-broad bandwidth covering the entire “THz gap” and well beyond. Potential applications include nonlinear spectroscopy and imaging, as well as remote sensing and identification of hazardous materials. I will discuss the basic concept and mechanism of using air or selected gases as the media for the generation and detection of broadband pulsed THz waves. I will also present our recent results on the coherent control of THz wave generation through the manipulation of electron trajectories inside the laser-induced plasma, as well as my initial results on nonlinear responses of metamaterials utilizing THz wave air photonics.


**Biography:** Dr. Jianming Dai received the M. S. and Ph.D. degrees in Optics from Tianjin University, in 1991 and 1994, respectively. In 1999, he became an associate professor in Tianjin University. After he joined United States in 2000, he was with Department of Chemistry at Temple University, Department of Chemistry (Institute for Lasers, Photonics and Biophotonics) at the State University of New York at Buffalo, School of Electrical & Computer Engineering at Oklahoma State University, and the Institute of Optics at University of Rochester. He joined Rensselaer Polytechnic Institute in 2005. He is currently a research associate professor and the manager of W. M. Keck Laboratory at the Center for Terahertz Research at Rensselaer, where he is leading the research on THz wave air photonics.